

REMARKS

Reconsideration of this application, as amended, is respectfully requested.

Claims 45-47, 50-54, 60-63, and 65-69 are pending. Claims 45-47, 50-54, 60-63, and 65-69 stand rejected.

Claims 45, 51, 61-63, and 65 have been amended. Claims 52 – 54, 68 and 69 have been cancelled. Claims 70 - 72 have been added. Support for the amendments is found in the specification, the drawings, and in the claims as originally filed. Applicants submit that the amendments do not add new matter.

Rejections Under 35 U.S.C. § 112

The Examiner has rejected claim 69 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. The Examiner has stated that

The term “the coating material is selected based upon a composition of a wafer” in claim 69 is a relative term which renders the claim indefinite. In this claim the coating material is claimed to be based upon the composition of the wafer. Since the composition of the wafer could change, the scope of this claim is rendered indefinite.

(p. 2, Office Action 1/7/04)

In response, applicants have cancelled claim 69.

Rejections Under 35 U.S.C. § 103(a)

Claims 45-47, 50, 52, 53 and 65-69 stand rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,149,727 of Yoshioka, et al. (“Yoshioka”) in view of U.S. Patent No. 6,120,660 of Chu, et al. (“Chu”) and U.S. Patent No. 5,647,953 of Williams, et al. (“Williams”).

Chu discloses

In a specific embodiment, the present system includes a novel susceptor design 82 using a silicon coating 205. The silicon coating 205 is defined on substantially all surfaces, including top, sides, and bottom, of the susceptor 82, which holds silicon wafer 201. The silicon coating includes a silicon bearing compound. In most embodiments, the silicon coating is desirable in a process using silicon wafers or the like. The coating can be made of any suitable material that is sufficiently resistant to implantation and temperature influences. As merely an example, the silicon coating can be an amorphous silicon layer, a crystalline silicon, or a polysilicon thickness for providing protection or isolating the base susceptor material 211, as shown in FIG. 2A, for example.

(Col. 6, lines 48-60)

Since the coating is made of the same or similar material as...

(Col. 6, line 67)

The silicon coating is often about 0.5 micrometers to about 2.0 micrometers or thicker, depending upon the embodiment.

(Col. 7, lines 18-19)

Williams discloses

During the cleaning step, some reaction products are absorbed onto the cold surfaces which are not coated in the coating step and if such products are not removed they could affect subsequent substrate processing (e.g., F and/or Al could be introduced into substrates such as wafers processed after the cleaning procedure). It has been found that use of SiH₄ as the conditioning gas reduces the amount of fluorine retained on remote portions of the interior surfaces of the reactor.

(Col. 5, lines 23-28)

During the coating step the walls are maintained at ambient and the horn and shield are maintained at 70.degree. C. This coating step is effective in trapping F and Al in a silicon dioxide coating and sticking particles not removed in the cleaning step to the reactor interior surfaces.

(Col. 6, lines 5-10)

Applicants respectfully submit, however, that amended claim 45 is not obvious under 35 U.S.C. § 103 in view of Yoshioka, Chu and Williams. Claim 45, as amended, includes the limitations

An apparatus for delivering media to a wafer, comprising:
a housing defining a process chamber;
a spin chuck positioned in the process chamber, the spin chuck
having a wafer support surface, the wafer support surface coated with a
coating layer such that at least a portion of a particulate matter on the wafer
support surface is encapsulated by the coating layer; and
a skirt positioned at a periphery and in a non-planar relationship to
the wafer support surface such that a magnitude of radial thermal gradients
in a wafer positioned on the spin chuck is reduced.

(Amended claim 45) (Emphasis added)

Applicants respectfully submit that none of Yoshioka, Chu, and Williams, alone or in combination, disclose the limitation of a skirt as claimed. Moreover, applicants respectfully submit that Chen does not remedy this deficiency.

The shield ring of Chen, which the Examiner is equating with the skirt of the present invention, is not positioned as the skirt, or function as the skirt, and, therefore, applicants submit, does not render the skirt obvious.

As shown in Figure 1 of Chen, and described in the text, the shield ring 48 rests on the ledge 46 of the translucent quartz shell 20. The shield ring 48 is in a “non-planar relationship to the wafer support surface” (i.e., the ring-shaped wafer seat 40, of Chen). However, the shield ring 48 is not positioned at the “periphery” of the wafer support surface as claimed. There is a gap between the ring-shaped wafer seat 40 and the shield ring 48. This gap is shown more clearly in Figure 2 of Chen and is described in reference to Figure 2. Chen discloses

“A passage 60 is defined between the opposing surfaces of the wafer seat 40 and the shield ring 48”

(Chen, Col. 3, lines 40 – 41)

It is because of this gap, which allows light from the halogen lamp 14 to reach the tubular member 18, that the tubular member is constructed with a quartz shell 20 and an opaque core 22.

In addition to not being positioned as the claimed skirt, the shield ring 48 also does not function as the claimed skirt. The skirt reduces radial thermal gradients of the wafer by being directly under, some or all, of the wafer that overhangs the wafer support surface. The skirt does not contact the wafer (i.e., it is in a “non-planar relationship to the wafer support surface”), because that would interfere with the wafer support surface. In Chen, shield ring 48 prevents light from the halogen lamp 14 from reaching, and affecting the pyrometer 16. This is done so that the pyrometer can have an accurate reading in order to accurately control the halogen lamp to accurately heat the wafer. This is related to how much light is directed onto the wafer for heating and is not related to reducing “radial thermal gradients” in the wafer.

For these reasons, applicants respectfully submit that claim 45, as amended, is not rendered obvious by the cited references, alone or in combination.

Given that claims 46, 47, 50, 51, 61 – 63, and 65 – 67 depend, directly or indirectly from claim 45, applicants respectfully submit that claims 46, 47, 50, 51, 61 – 63, and 65 – 67 are, likewise, not rendered obvious by the cited references, alone or in combination.

Applicants respectfully submit that new claim 70 is not anticipated or rendered obvious by any of the cited references, alone or in combination. New claim 70 includes the following limitations

An apparatus for delivering media to a wafer, comprising:
a housing defining a process chamber; and
a spin chuck positioned in the process chamber, the spin chuck having a wafer support surface, the wafer support surface coated with a coating layer such that at least a portion of a particulate matter on the wafer support surface is encapsulated by the coating layer, and wherein the wafer support surface includes a line contact vacuum ring.

(New claim 70) (Emphasis added)

Applicants respectfully submit that none of the cited references include a wafer support surface having a line contact vacuum ring as claimed, nor do any of the references, alone or in combination render such a limitation obvious. For this reason, applicants respectfully submit that new claim 70 is not anticipated or rendered obvious by any of the cited references, alone or in combination.

Given that claims 71 and 72 depend from claim 70, applicants submit that claims 71 and 72 are, likewise, not obvious under § 103 in view of the references cited by the Examiner.

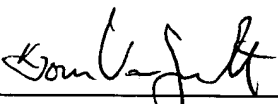
Moreover, claim 72 is not rendered obvious by any of the cited references, alone or in combination for the reasons discussed above in reference to amended claim 45.

It is respectfully submitted that in view of the amendments and arguments set forth herein, the applicable rejections and objections have been overcome. If there are any additional charges, please charge Deposit Account No. 02-2666 for any fee deficiency that may be due.

Respectfully submitted,

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